US011599207B2

(12) **United States Patent**
Zhang

(10) **Patent No.: US 11,599,207 B2**
(45) **Date of Patent: Mar. 7, 2023**

(54) **MULTIFUNCTION MOUSE**

(71) Applicant: **Kai Zhang**, Hunan (CN)

(72) Inventor: **Kai Zhang**, Hunan (CN)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **17/811,311**

(22) Filed: **Jul. 8, 2022**

(65) **Prior Publication Data**

US 2022/0342493 A1 Oct. 27, 2022

(30) **Foreign Application Priority Data**

Jan. 14, 2022 (CN) 202220105525.1

(51) **Int. Cl.**
G06F 3/0354 (2013.01)

(52) **U.S. Cl.**
CPC ***G06F 3/03543*** (2013.01)

(58) **Field of Classification Search**
CPC G06F 3/03543
USPC 345/163
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2013/0038533 A1* 2/2013 Lo G06F 3/03543 345/163

FOREIGN PATENT DOCUMENTS

CN 215494941 U * 1/2022

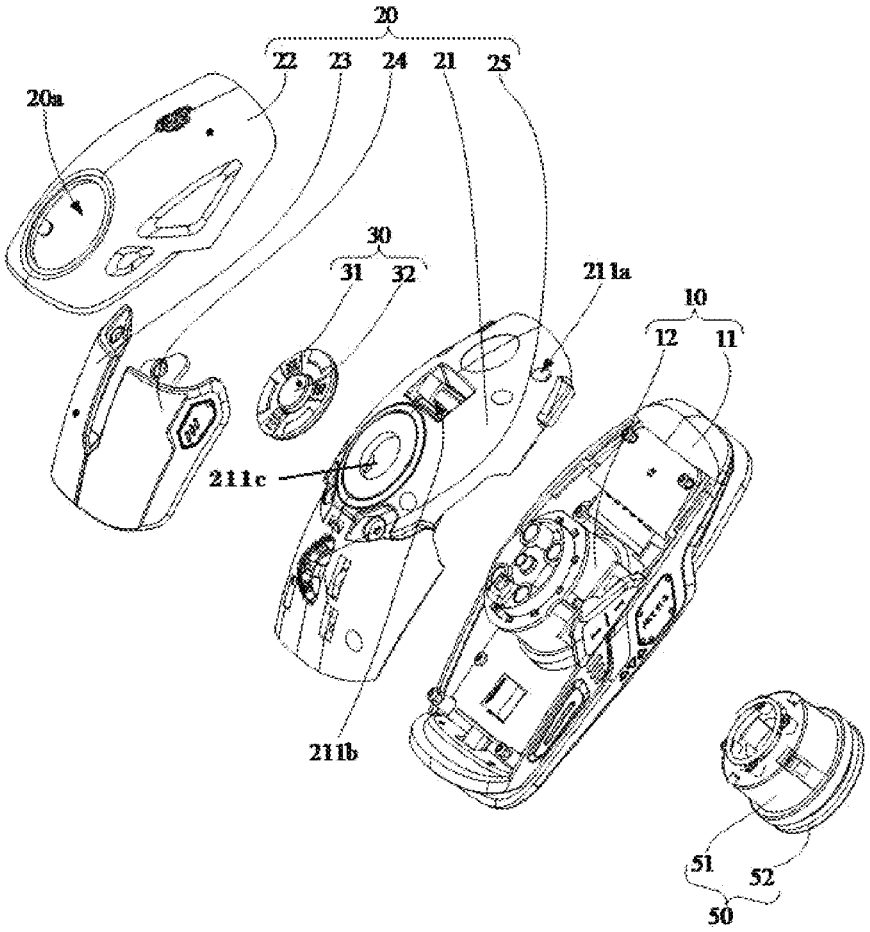
* cited by examiner

Primary Examiner — Mark Edwards

(57) **ABSTRACT**

A computer mouse include a base; a cover assembly releasably secured to the base and including an opening; and a rotational device disposed in the opening to rotatably secure to the base. The rotational device includes a disc-shaped external rotational member including a circular flange on one surface, the circular flange disposed through the opening to rotatably secure to the base, the circular flange having a through hole; and a disc-shaped internal rotational member partially disposed in the through hole.

5 Claims, 8 Drawing Sheets



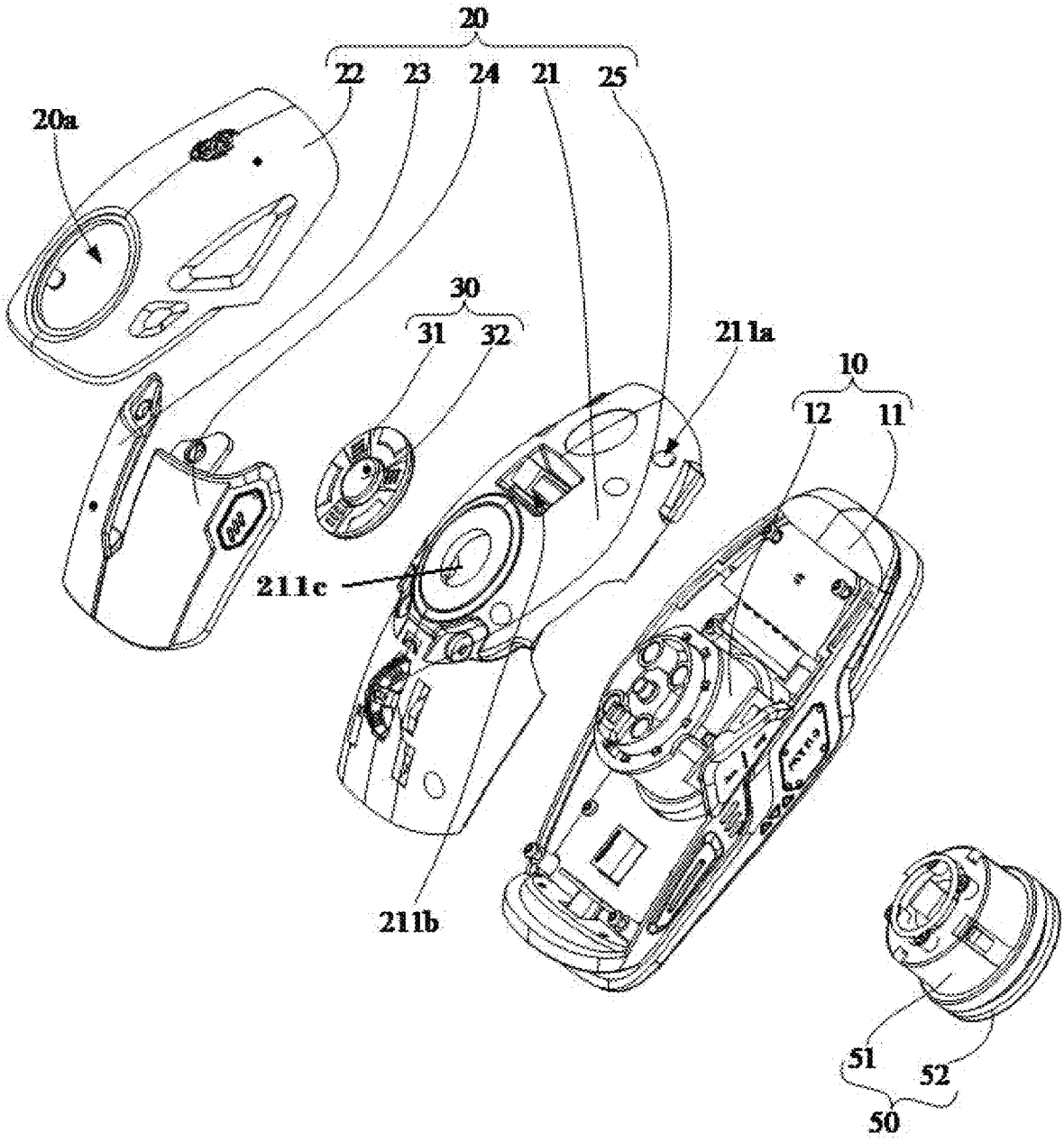


FIG.1

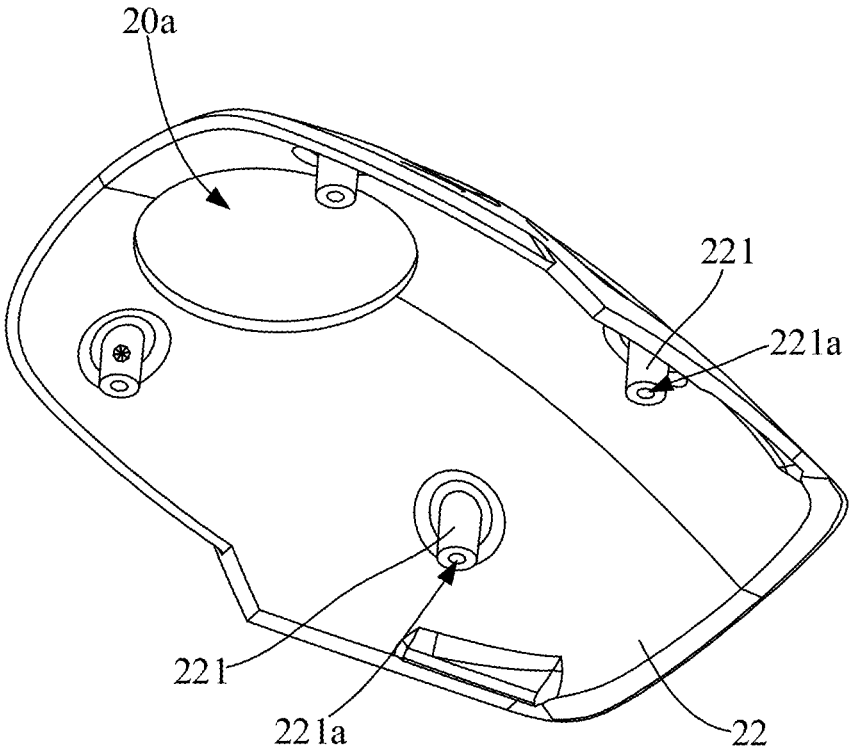


FIG.2

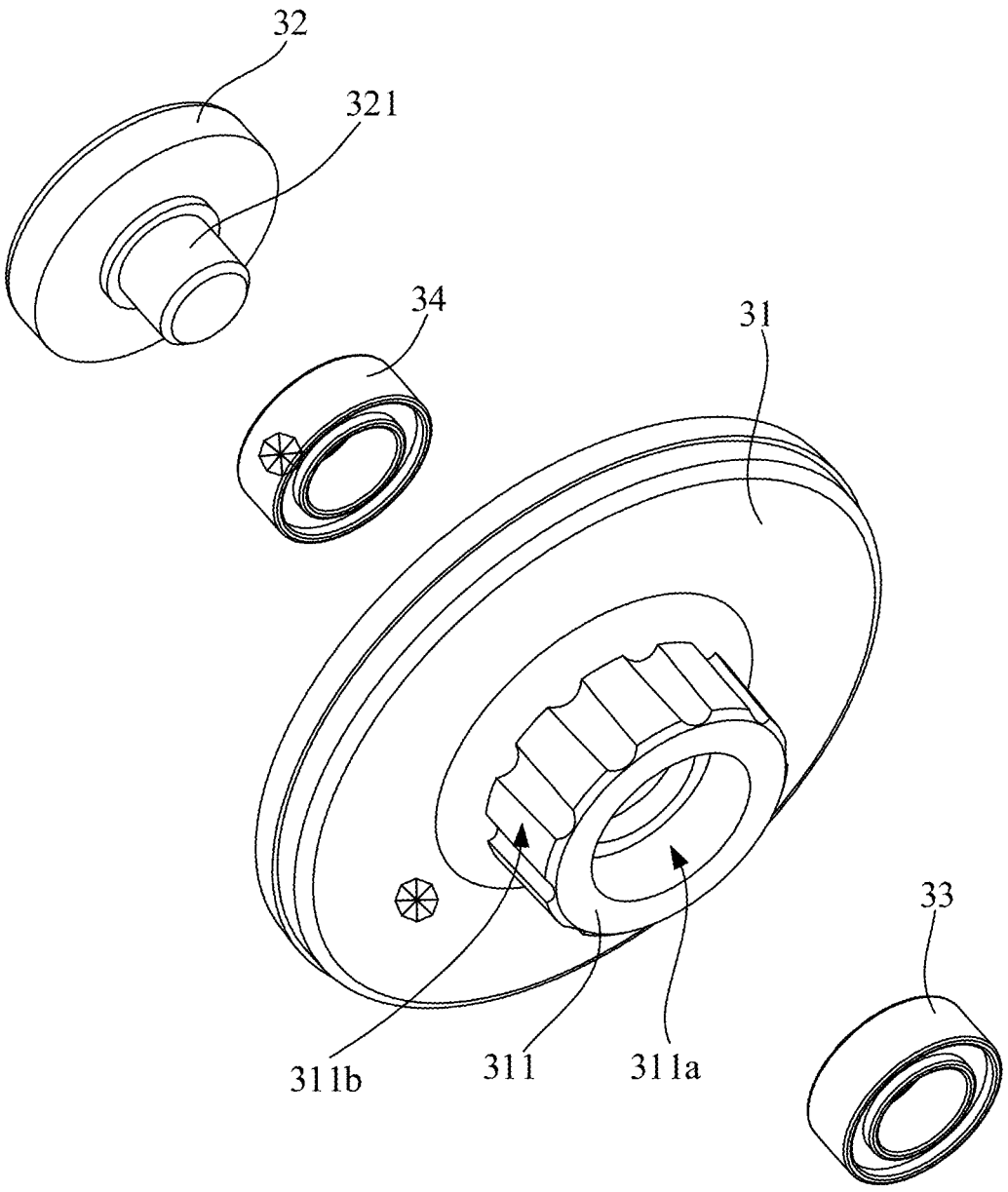
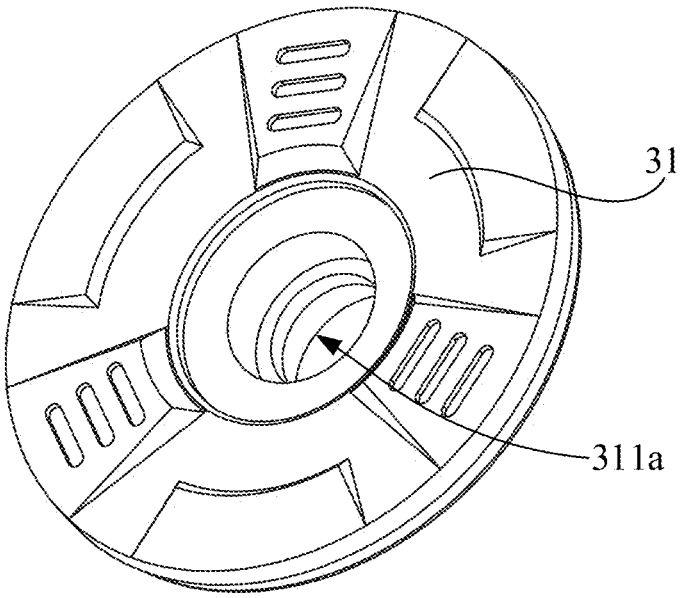


FIG.3

FIG.4A



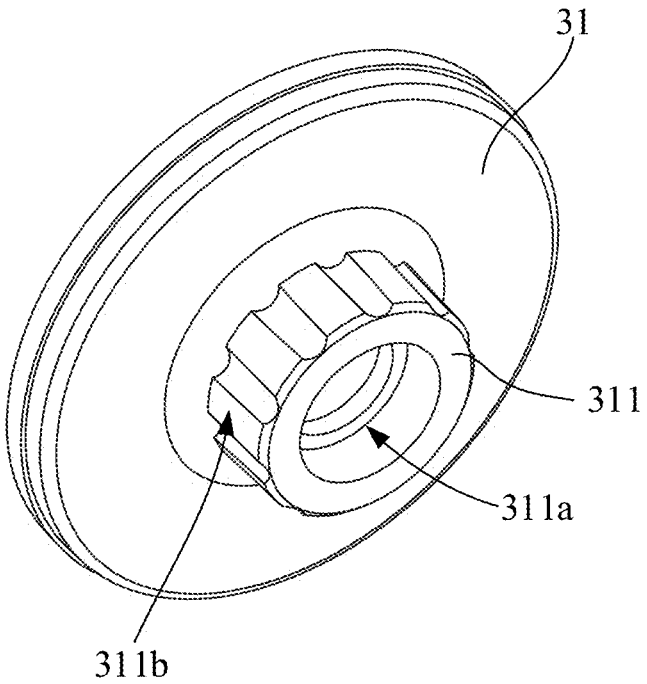


FIG.4B

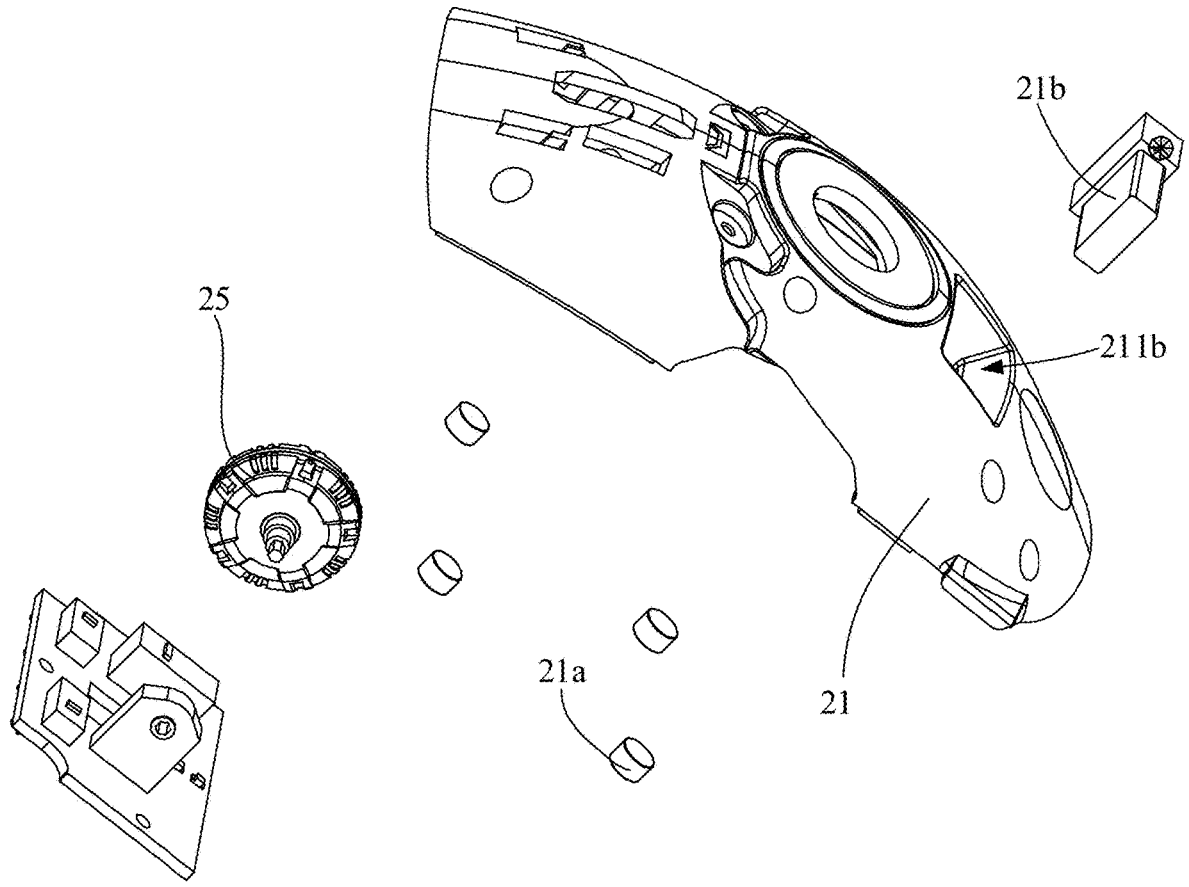


FIG.5

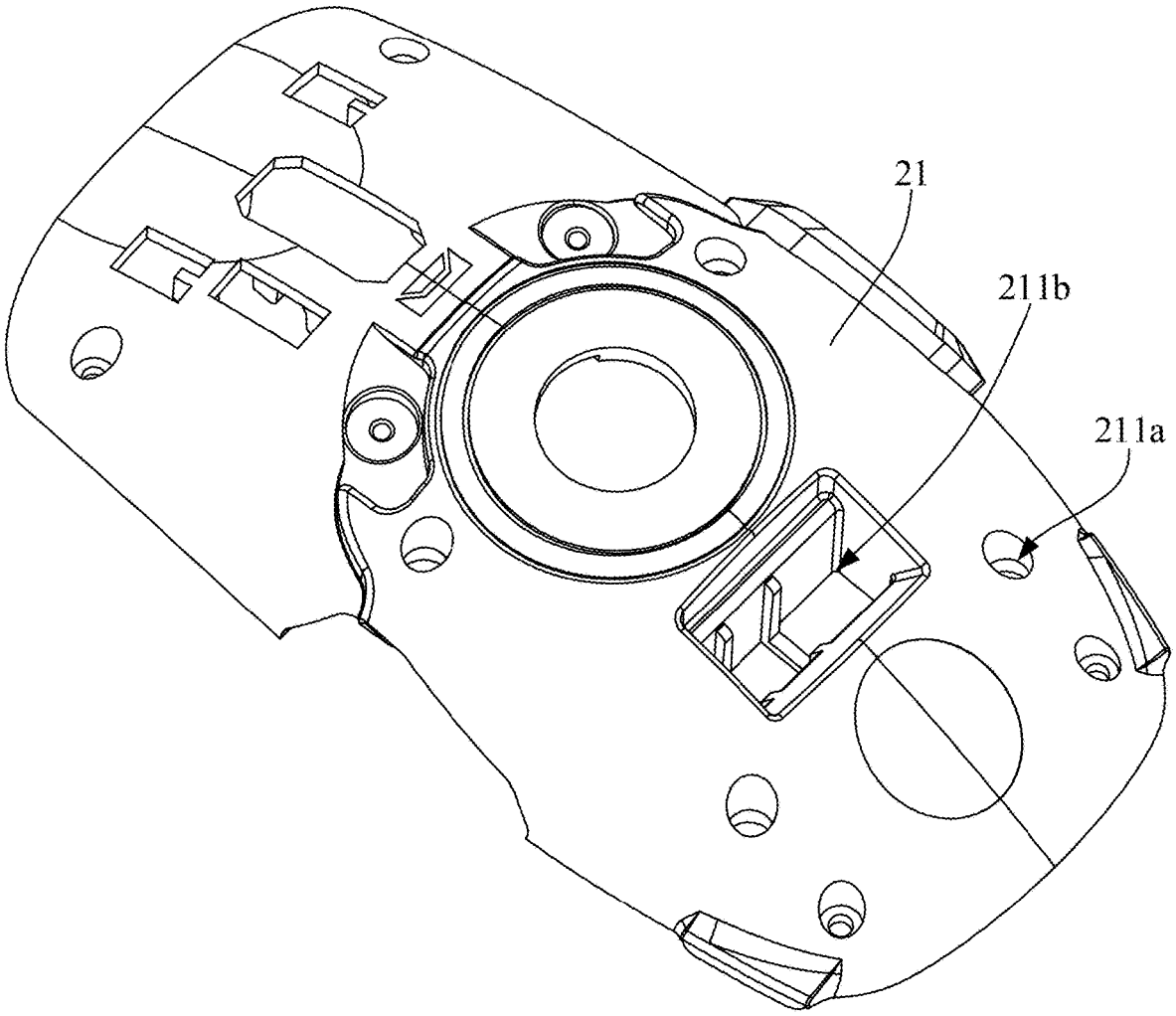


FIG.6

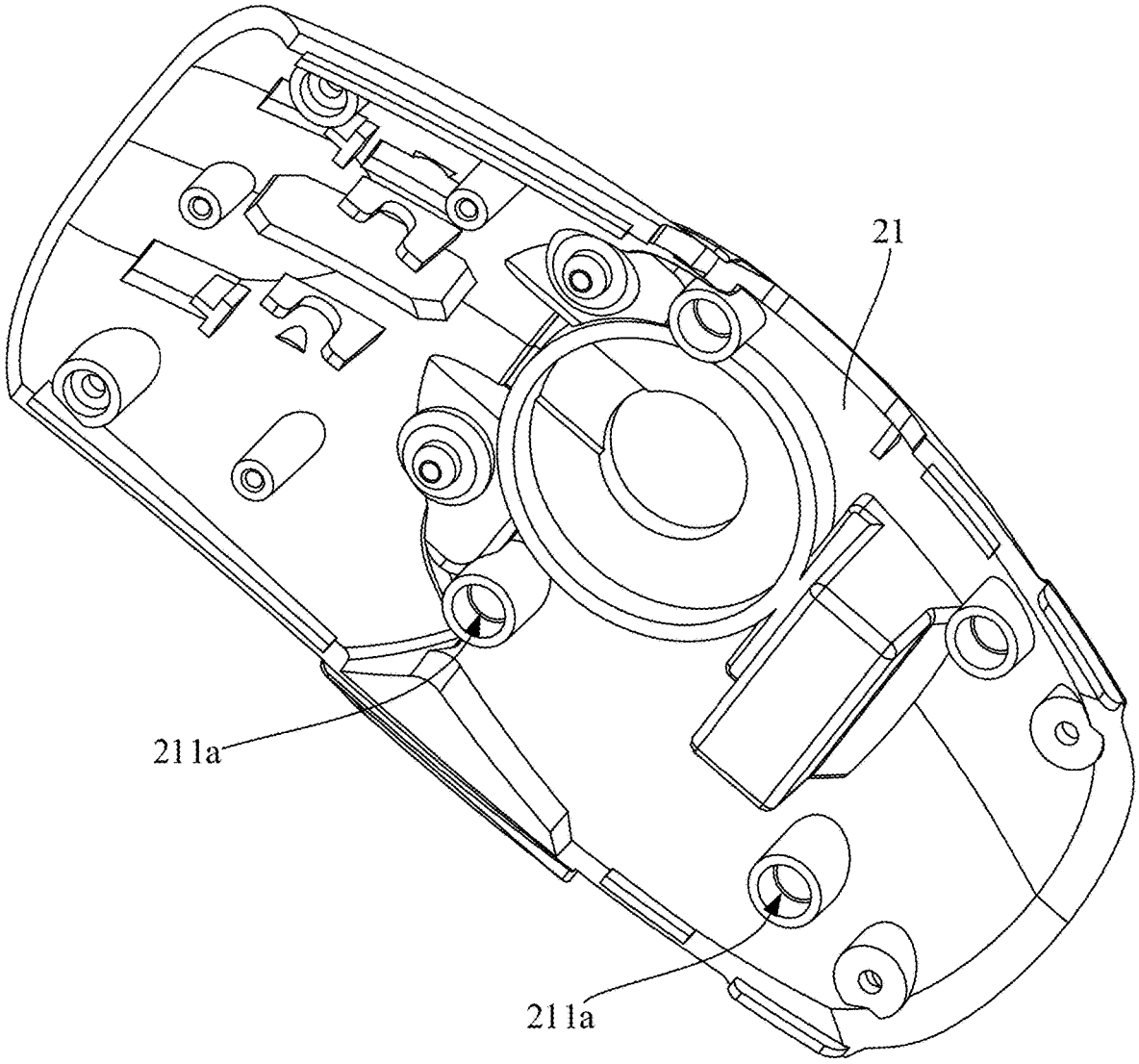


FIG.7

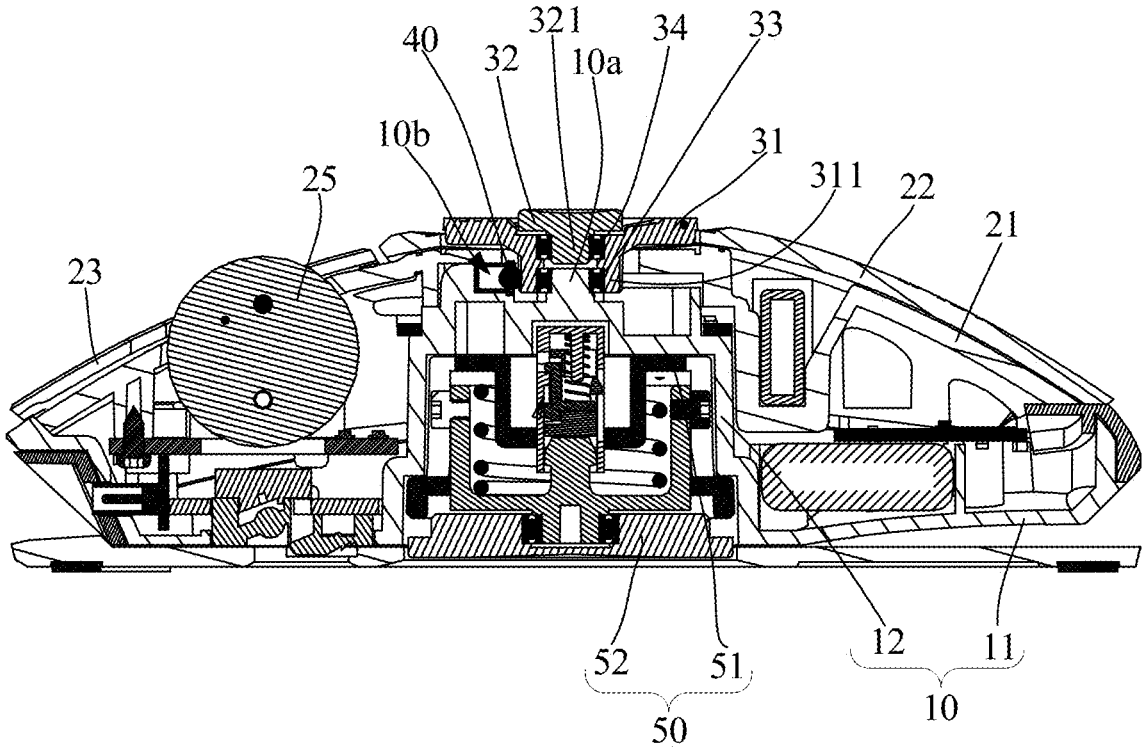


FIG.8

MULTIFUNCTION MOUSE

FIELD OF THE INVENTION

The invention relates to computer mouse and more particularly to a multifunction mouse.

BACKGROUND OF THE INVENTION

A computer mouse is a hand-held pointing device that detects two-dimensional motion relative to a surface. This motion is translated into the motion of a pointer on a display, which allows a smooth control of the graphical user interface of a computer. A wireless mouse, as another type mouse, may transmit data via radio.

However, people may have sore and stiff muscles after long periods of time of using a typical mouse.

SUMMARY OF THE INVENTION

The invention has been made in an effort to solve the problems of the conventional art including having sore and stiff muscles after long periods of time of using a mouse by providing a multifunction mouse having novel and nonobvious characteristics.

To achieve above and other objects of the invention, the invention provides a computer mouse comprising a base; a cover assembly releasably secured to the base and including an opening; and a rotational device disposed in the opening to rotatably secure to the base.

Preferably, the rotational device includes a disc-shaped external rotational member including a circular flange on one surface, the circular flange disposed through the opening to rotatably secure to the base, the circular flange having a through hole; and a disc-shaped internal rotational member partially disposed in the through hole.

Preferably, the internal rotational member includes a cylindrical projection disposed in the through hole; the base includes a cylindrical protrusion on an end; and the rotational device further comprises a first bearing disposed in the through hole and put on the cylindrical protrusion, and a second bearing disposed in the through hole and put on the cylindrical projection.

Preferably, the circular flange further comprises a toothed outer surface; and the base further comprises a recess around the cylindrical protrusion and at least one steel ball disposed in the recess to rotatably contact the toothed outer surface.

Preferably, the base further comprises a body releasably secured to the cover assembly, and a hollow, cylindrical mounting member on an inner surface of the body; and wherein the rotational device is rotatably secure to the mounting member.

Preferably, further comprises a rotational member including a cylindrical mounting element rotatably, releasably disposed in the mounting member, and a base element.

Preferably, the cover assembly comprises a top member releasably mounted on the base, the top member including the opening; a covering body releasably mounted between the top member and the base, the covering body including a central opening aligned with the opening, a front, left shell, and a front, right shell being a mirror image of the front, left shell.

Preferably, the top member further comprises a plurality of steel protuberances on a bottom, each of the protuberances including a hole; the covering body further comprises a plurality of bossed holes and a plurality of magnets magnetically disposed in the bossed holes respectively; and

the covering body includes and the magnets are configured to attract the protuberances when the protuberances are inserted into the bossed holes respectively, thereby magnetically fastening the top member and the covering body together.

Preferably, the covering body further comprises a rear socket and a radio frequency transmitter disposed in the rear socket.

Preferably, further comprises a scroll wheel disposed between the front, left shell and the front, right shell, and rotatably mounted in the covering body.

The computer mouse of the invention has the following advantageous effects in comparison with the prior art: if a user has sore and stiff muscles after long periods of time of using the computer mouse the user may use the finger to rotate the rotational device relative to both the cover assembly and the base. The rotation may stimulate nerves of the brain. Thus, the user may feel a degree of comfort.

The above and other objects, features and advantages of the invention will become apparent from the following detailed description taken with the accompanying drawings

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is an exploded view of a multifunction mouse of a preferred embodiment of the invention;

FIG. **2** is a perspective view of the cover;

FIG. **3** is an exploded view of the rotational device;

FIG. **4**A is a perspective view of the rotational device;

FIG. **4**B is another perspective view of the rotational device;

FIG. **5** is an exploded view of the covering body of the rotational device;

FIG. **6** is a perspective view of the assembled covering body;

FIG. **7** is another perspective view of the covering body of FIG. **6**; and

FIG. **8** is a longitudinal sectional view of the multifunction mouse.

DETAILED DESCRIPTION OF THE INVENTION

Referring to FIGS. **1** to **8**, a multifunction mouse in accordance with a preferred embodiment of the invention comprises a base **10**, a cover assembly **20** and a rotational device **30** as discussed in detail below.

The base **10** is made of metal and includes a body **11** and a hollow, cylindrical mounting member **12** on an inner surface, the mounting member **12** including a cylindrical protrusion **10***a* on an end and a recess **10***b* around the protrusion **10***a* with at least one steel ball **40** disposed therein.

The cover assembly **20** and the base **10** releasably secured together to form a housing. The cover assembly **20** includes an opening **20***a*. The rotational device **30** is disposed through the opening **20***a* into the housing to rotatably secure to the base **10**.

In the embodiment, if a user has sore and stiff muscles after long periods of time of using the multifunction mouse the user may use the finger to rotate the rotational device **30** relative to both the cover assembly **20** and the base **10**. The rotation may stimulate nerves of the brain. Thus, the user may feel a degree of comfort.

The rotational device **30** includes a disc-shaped external rotational member **31** including a circular flange **311** on one surface, the flange **311** disposed through the opening **20***a*

into the housing to rotatably secure to the base **10**, the flange **311** having a through hole **311***a* and a toothed outer surface **311***b* contacting the steel ball **40**; a disc-shaped internal rotational member **32** including a cylindrical projection **321** in the through hole **311***a*; a first bearing **33** put on the protrusion **10***a* to contact an inner surface of the flange **311**; and a second bearing **34** put on the projection **321** to contact the inner surface of the flange **311**. As a result, the rotational device **30** and the base **10** are assembled. The rotational device **30** is configured to rotate about the mounting member **12**.

A click can be heard when the user rotates the external rotational member **31**. Thus, the user may feel a degree of comfort.

Preferably, both the external rotational member **31** and the internal rotational member **31** have a pattern of different colors so that the use may feel a degree of happiness in using the mouse.

There is further provided with a replaceable rotational member **50** including a cylindrical mounting element **51** rotatably releasably disposed in the mounting member **12**, and a base element **52**. Preferably, the mounting element **51** and the mounting member **12** are magnetically attached each other.

The cover assembly **20** includes a covering body **21** releasably mounted on the base **10** and including a plurality of bossed holes **211***a* along an edge and a plurality of magnets **21***a* disposed in the bossed holes **211***a* respectively, a rear socket **211***b*, and a central opening **211***c* aligned with the flange **311** so that the flange **311** may pass through the central opening **211***c*, a top member **22** releasably mounted on the base **10** and including the opening **20***a*, a plurality of steel protuberances **221** on a bottom, the protuberance **221** including a hole **221***a* so that the magnet **21***a* may attract the protuberance **221** when the protuberance **221** is inserted into the bossed hole **211***a*, thereby magnetically fastening the top member **22** and the covering body **21** together, a front, left shell **23**, a front, right shell **24** being a mirror image of the left shell **23**, and a scroll wheel **25** rotatably disposed through a gap between the left shell **23** and the right shell **24**. The left shell **23**, the right shell **24** and the covering body **21** threadedly secured together. The top member **22**, the left shell **23** and the right shell **24** consists of a top of the multifunction mouse. The rotational device **30** is disposed on the top member **22**.

Preferably, the scroll wheel **25** is provided with a light-emitting diode (LED) so that it may emit light in operation.

A radio frequency transmitter **21***b* is provided in the socket **211***b* for transmitting information to a receiver which is coupled to a host computer.

While the invention has been described in terms of preferred embodiments, those skilled in the art will recognize that the invention can be practiced with modifications within the spirit and scope of the appended claims.

What is claimed is:

1. A computer mouse, comprising:

a base;

a cover assembly releasably secured to the base and including an opening; and

a rotational device disposed in the opening to rotatably secure to the base;

wherein the rotational device includes a disc-shaped external rotational member including a circular flange on one surface, the circular flange disposed through the opening to rotatably secure to the base, the circular flange having a through hole; and a disc-shaped internal rotational member partially disposed in the through hole.

2. The computer mouse of claim **1**, wherein the internal rotational member includes a cylindrical projection disposed in the through hole; the base includes a cylindrical protrusion on an end; and the rotational device further comprises a first bearing disposed in the through hole and put on the cylindrical protrusion, and a second bearing disposed in the through hole and put on the cylindrical projection.

3. The computer mouse of claim **2**, wherein the circular flange further comprises a toothed outer surface; and the base further comprises a recess around the cylindrical protrusion and at least one steel ball disposed in the recess to rotatably contact the toothed outer surface.

4. The computer mouse of claim **1**, wherein the cover assembly further comprises a top member releasably mounted on the base, the top member including the opening; a covering body releasably mounted between the top member and the base, the covering body including a central opening aligned with the opening, a front, left shell, and a front, right shell being a mirror image of the front, left shell; and

wherein the top member further comprises a plurality of steel protuberances on a bottom, each of the steel protuberances including a hole;

wherein the covering body further comprises a plurality of bossed holes and a plurality of magnets magnetically disposed in the bossed holes respectively; and

wherein the magnets are configured to attract the steel protuberances when the steel protuberances are inserted into the bossed holes respectively, thereby magnetically fastening the top member and the covering body together.

5. The computer mouse of claim **4**, wherein the covering body further comprises a rear socket and a radio frequency transmitter disposed in the rear socket.

* * * * *